DOCUMENT RESUME

ED 055 185 VT 013 809

AUTHOR Maley, Donald

TITLE New Industrial Arts for the Senior High School: A Program of Relevance in a Dynamic Age.

INSTITUTION Maryland Univ., College Park. Dept. of Industrial Education.

PUB DATE Apr 70

NOTE 38p.; Presentation at the American Industrial Arts Association (Louisville, Ky., April 9, 1970)

EDRS PRICE MF-$0.65 HC-$3.29

DESCRIPTORS *Curriculum Development; Educational Change; Environmental Education; *Industrial Arts; Industrial Education; Institutional Role; *Relevance (Education); *Senior High Schools; Social Problems; Technological Advancement; *Technology

ABSTRACT

To be meaningful in the modern world, the senior high school industrial arts program should explore the application of technology in the solution of major social, environmental, and operational problems that face mankind. The content should be relevant for all students and involve them in the problems of the present and future. University of Maryland staff developed guidelines for the development of such a program, highlighting: (1) development of the individual, (2) process orientation, (3) greater student involvement, (4) a broad physical setting, i.e. school, community, and nation, and (5) contemporary textbook materials such as journals, magazines, and newspapers. Such a program would attract more students and develop in them concern and knowledge about the future of technology in society and its occupational implications. (CD)

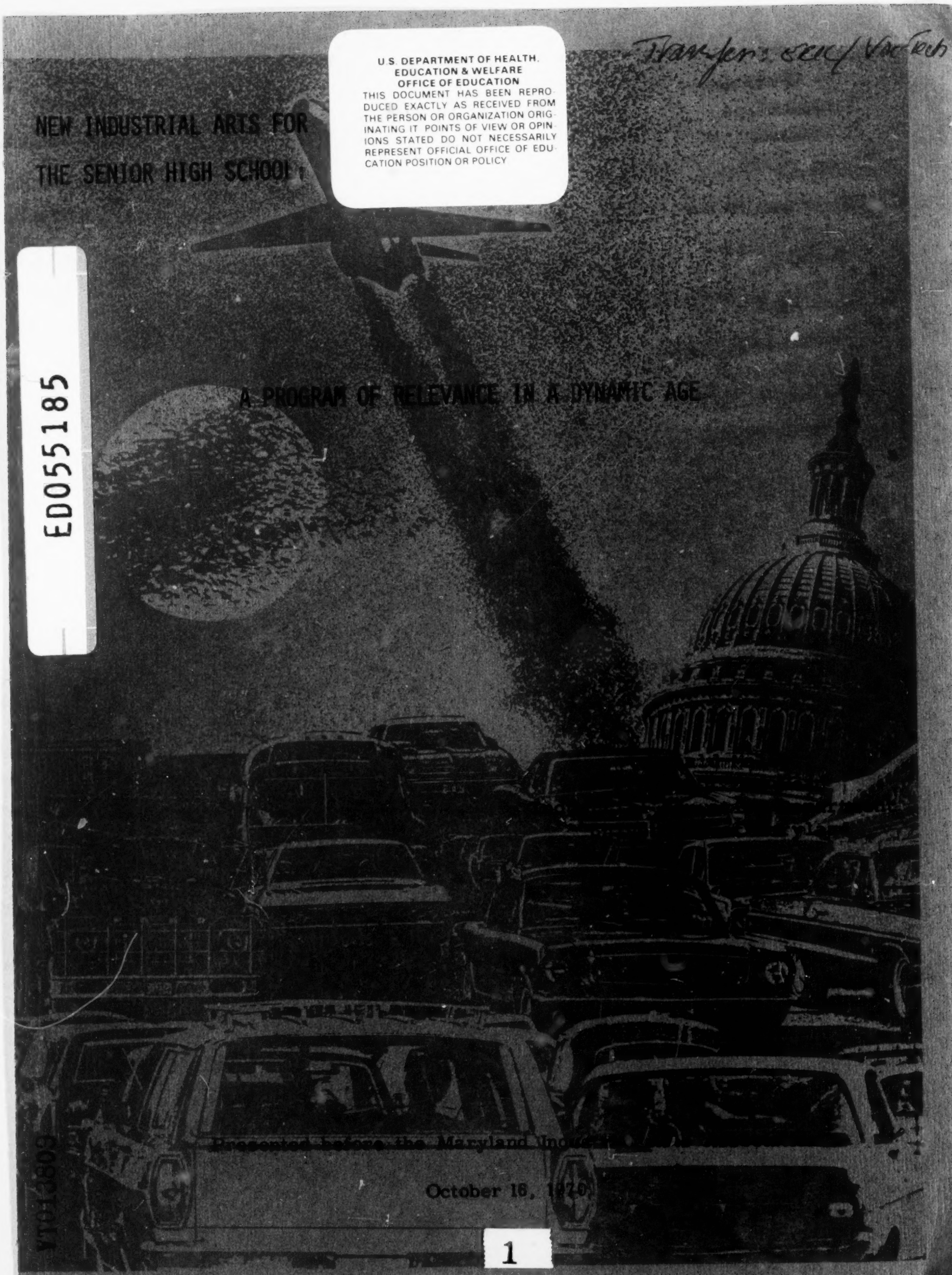
U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY

Transfer: ERIC/VocTech

NEW INDUSTRIAL ARTS FOR THE SENIOR HIGH SCHOOL:

A PROGRAM OF RELEVANCE IN A DYNAMIC AGE

ED055185



VT014 980

Presented before the Maryland Indus[illegible]

October 16, 1970

ED055185

"New Industrial Arts for the Senior High School:

A Program of Relevance in a Dynamic Age"

by

Donald Maley
Professor and Head
Industrial Education Department
University of Maryland

> "...We can no longer afford the kind of formalized education which takes the child into the future with his gaze fixed steadfastly on the past. Somehow we must convince our patrons that it is more important to help the child to think about the next civilization than to require him to remember the facts of the last one." (11, p.24)

This presentation deals with a projection of a new role for Industrial Arts at the senior high school level. And incidentally,

---

This presentation was originally made by Dr. Maley at the American Industrial Arts Association at Louisville, Kentucky, April 9, 1970

the precise terminology to describe the program or phase of education may appear as something different than the present Industrial Arts.

The proposal in this discussion grows out of a number of concerns, which I will present as questions.

1. What is the role for Industrial Arts at the senior high school as man moves into the Twenty-first Century?

2. What is the role for Industrial Arts in a post-industrial society?

3. Where can we best place our emphases in a curriculum area that is devoted to the study of industry and technology?

4. How and where can a program at the high school level establish relevance with the students and the world about them?

5. From a purely educative process, where can Industrial Arts (or some other appropriate title) place its major emphases when dealing with students who will live their lives in the dynamic, ever-changing, complex and somewhat unknown world of tomorrow?

No attempt will be made to deal with each of these questions completely. They merely serve to identify the nature of some of the agony that a sincere and challenged individual has been experiencing. They also serve as a catalytic element towards moving

Industrial Arts out into the mainstream of education and society in general.

The work on the proposed senior high school program by some of the staff at the University of Maryland grew out of their own multiple concerns as earlier expressed, in addition to persistent requests from high school teachers across the country for new and relevant programs. The time and the need for action in this area appeared long over-due.

The existing high school programs have not had any kind of professional concensus with regard to direction, substance, or even association with a definition. Through its unit laboratory organizational patterns the high school program has been dominated by specialized subject or content development as well as a form of pseudo vocational preparation.

The programs have been narrow in their appeal to students and have not provided the broad base general education framework so often espoused or advocated.

It is my hope that Industrial Arts teachers at the senior high school level would aspire to a place in the mainstream of education. The potentials for an increasingly important role in education are greatly enhanced as man turns increasingly to technology in the solution of his most pressing problems. The great void

in contemporary education exists in the area of understandings that separate the technologists from the vast majority of the populace. Here is a vital, dynamic, challenging role, and I bid you to venture into it with a zeal equal to the urgency of the task.

I also bid you to move out into the mainstream of life with a form of education that focuses on the future.

Thus my first reference point leads me to urge you to consider a future-oriented form of program. As such, it would be a form of education that is engendered in the present, but in reality must be a thrust into the future. The nature of this present-future orientation in education is best expressed in the following quotation.

> "Time, said St. Augustine, is a three-fold present: The present as we experience it, the past as a present memory, and the future as a present expectation. By that criterion, the world of the year 2000 has already arrived, for in the decisions we make now, in the way we design our environment and thus sketch the lines of constraints, the future is committed. ...The future is not an overarching leap into the distance; it begins in the present." (1, p.1)

The major problems facing mankind in the present may in fact provide the educational springboard for that entry into the future.

The program envisioned for the senior high school is an attempt to move the school from its traditional emphasis on passive involve-

ment with the past to an aggressive excitement and active encounter with the future. This latter involvement was identified by C. P. Snow as a matter of greatest need for man when he stated:

> "The world's greatest need is 'an appetite for the future'...All healthy societies are ready to sacrifice the existential moment for their children's future and for children after those. The sense of the future is behind all good policies. Unless we have it, we can give nothing either wise or decent to the world." (5,p.43)

The appetite for the future stands out as a principle feature of the program that I would like to discuss with you in the remaining time.

The development of the senior high school program as projected in this discussion grew out of a concentrated study over a period of several years. The final phase of the study involved a number of outstanding graduate students who organized as a data collection and data refining team.

The major topics studied by this group were the following:

1. The Nature of the Society in the Next 30 Years
2. Curriculum Trends at the Secondary School Level
3. The Nature of the Senior-High School Student
4. Socio-Psychological Theories Governing Man's Behavior.

The complete sequence of events or procedures that led up to

the projected program is presented in the schematics appearing on the following pages.

This intensive study and refinement process produced a significant quantity of data and a greatly expanded bibliography that extended into new and challenging dimensions of society -- today and tomorrow.

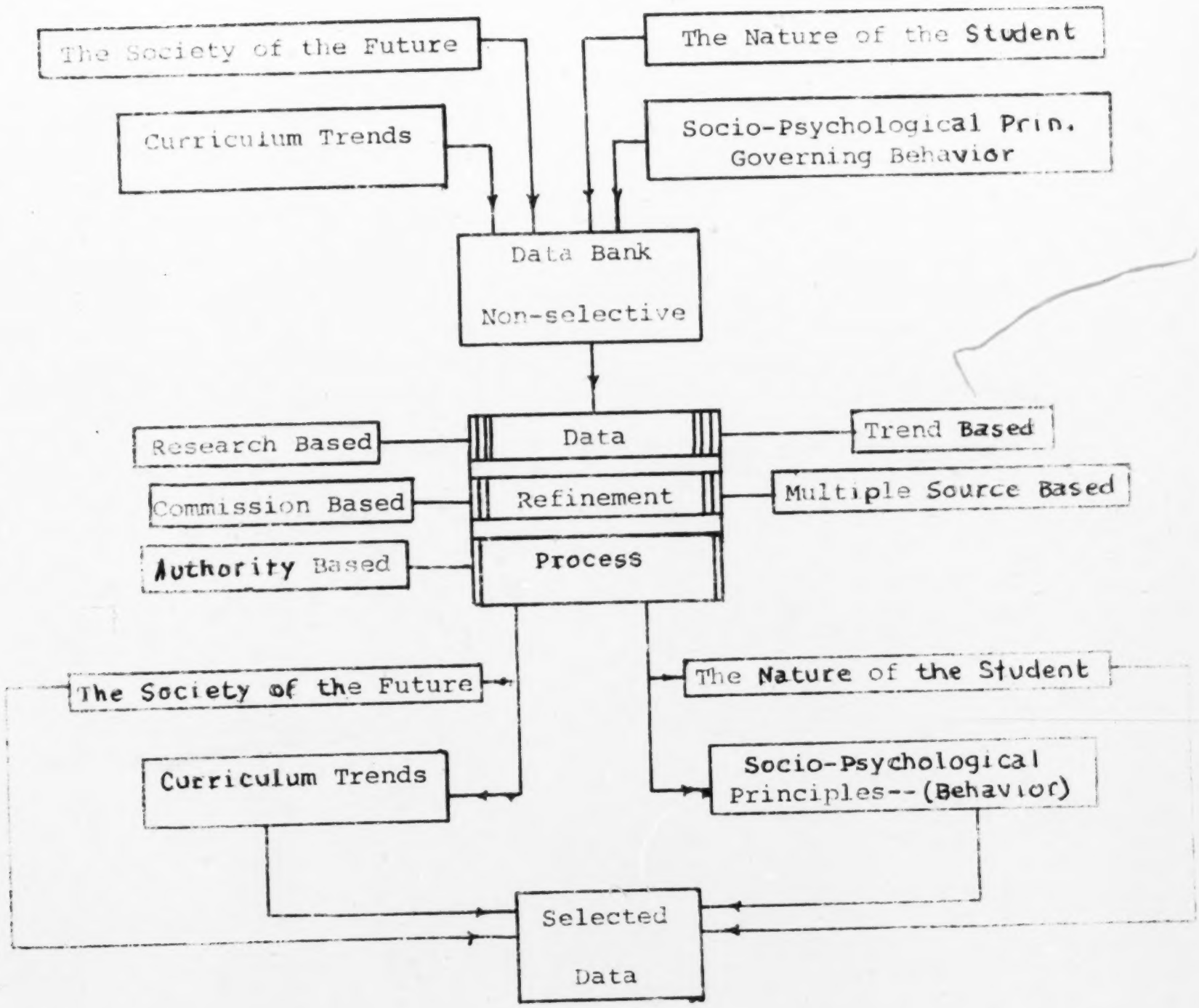
Underlying concepts basic to the direction of the program are as follows:

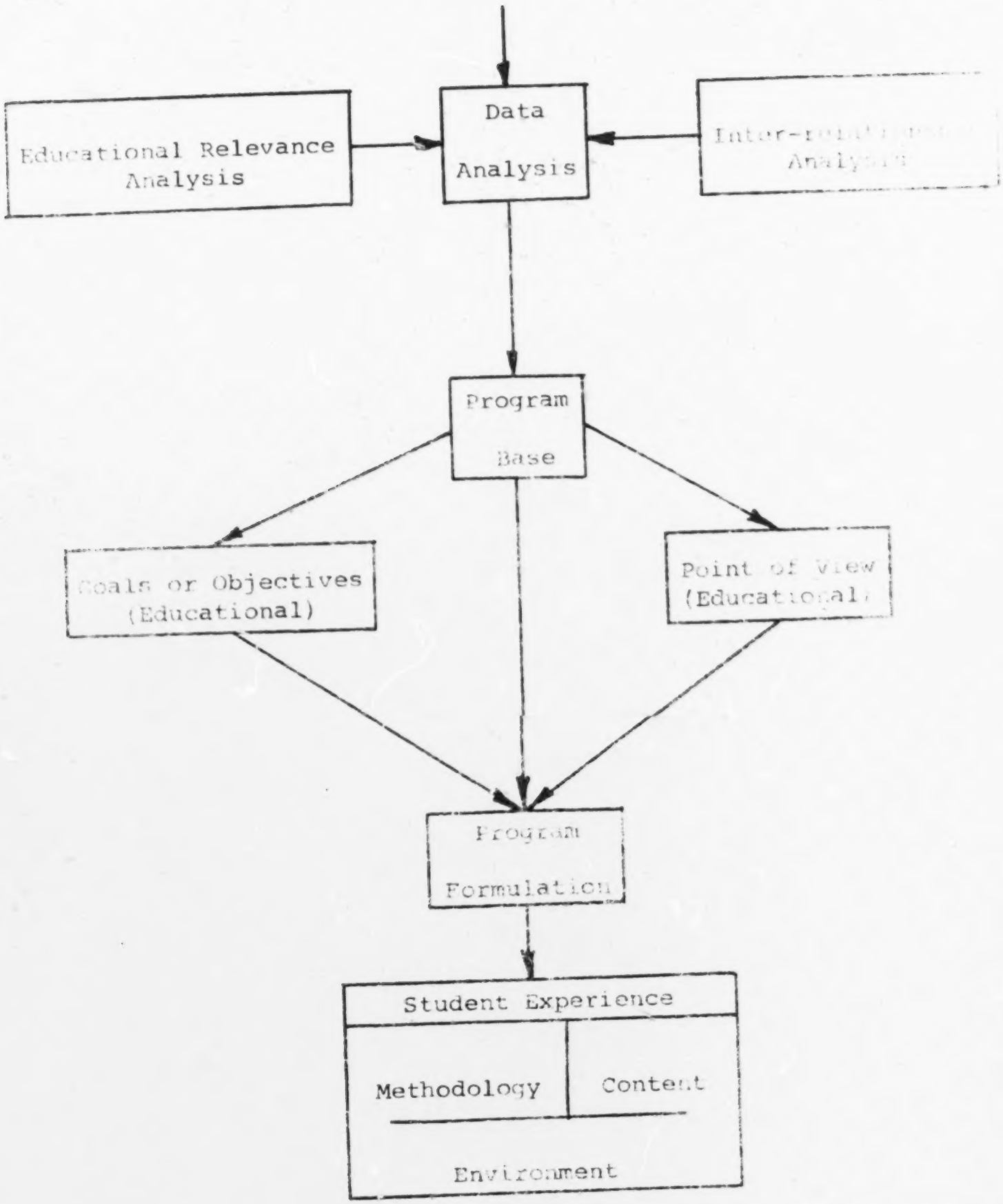
1. The students of today will live their lives in the future, thus the emphasis was on a program aimed at education for the future.

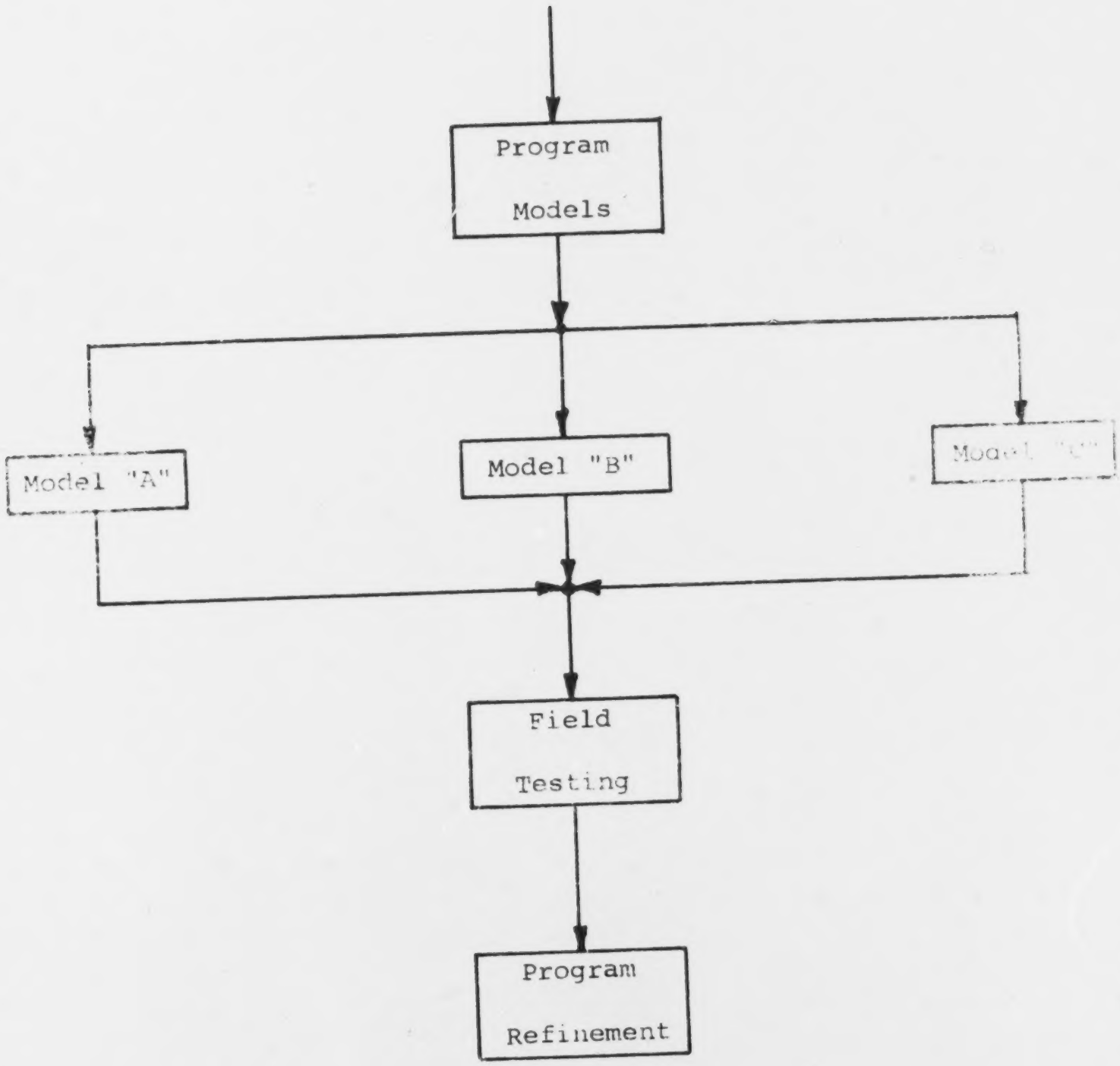
The concept of a future oriented program at the senior high school is reinforced by an awareness of the acceleration of technological innovation. The time between invention and widespread application of that invention may have taken a hundred years in past societies. As an example, it took 112 years for photography (1727-1839). Today the time lag is greatly reduced for many significant and far-reaching innovations. It took just five years (1948-1953) from invention to widespread application for the transistor. The integrated circuit took only three years (1958-1961).

The significance of this acceleration of technological innovation is the greatly reduced lead time permitted society to adjust.

Program Development Model
for the
Senior High School
Industrial Arts




Educational Relevance Analysis
Data Analysis
Inter-[illegible] Analysis
Program Base
Goals or Objectives (Educational)
Point of View (Educational)
Program Formulation
Student Experience
Methodology
Content
Environment


Program
Models
Model "A"
Model "B"
Model "C"
Field
Testing
Program
Refinement

Herein lies the cause of numerous social and emotional problems associated with a dynamic age such as ours. This increased acceleration of technological innovation also has a profound effect on the phenomena of obsolescence which appears as a common issue in contemporary commentary.

Education and the products of education in a dynamic age, may actually be casualties due to the rate of technological turnover or innovation. That education which focuses on today (in this or subsequent decades) is actually preparing people for yesterday.

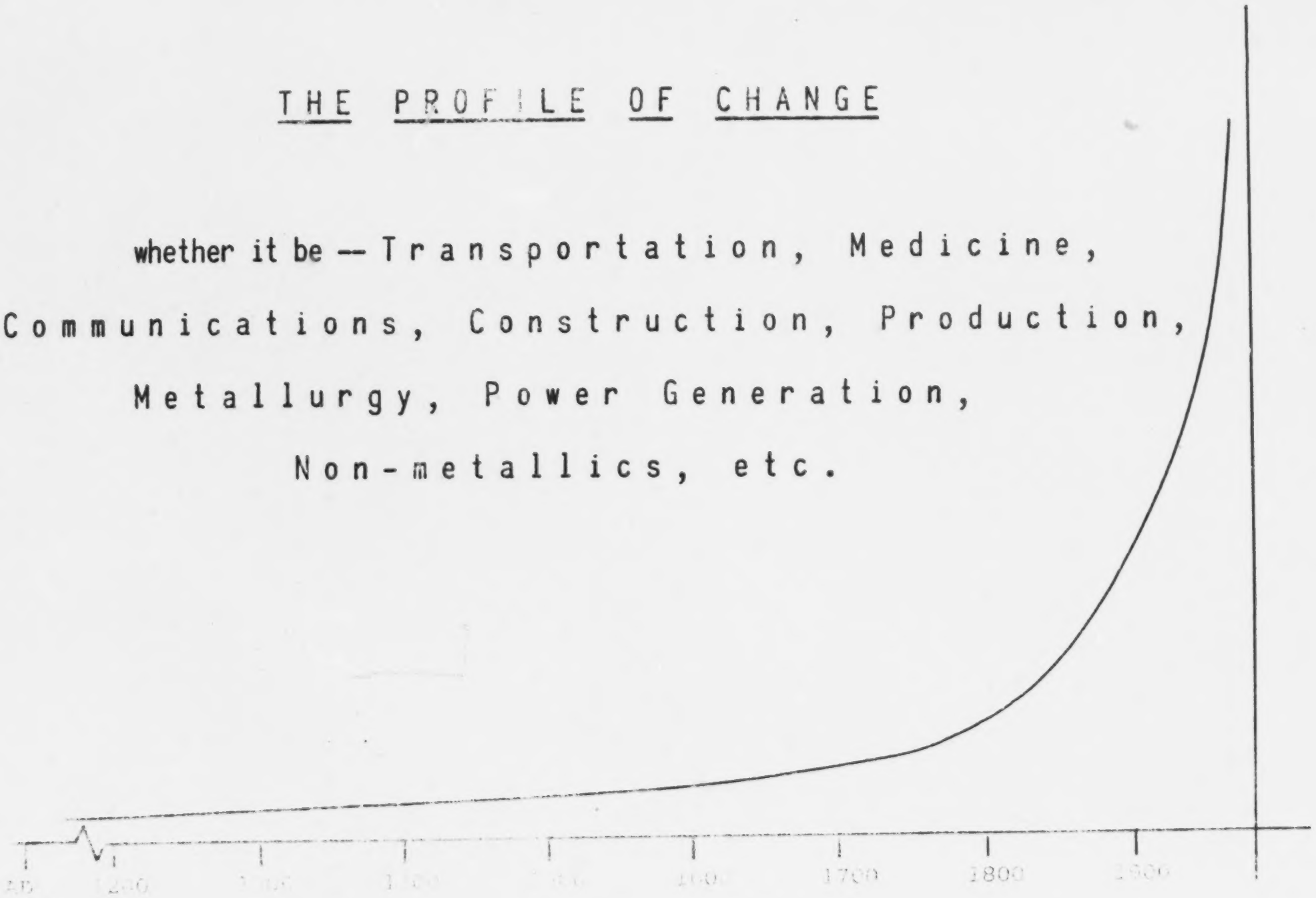
The future of communications, transportation, power generation, etc., is already on the drawing boards, or in pilot experimental models. To develop in people the ability to anticipate, to adjust, and to make effective decisions in a dynamic and accelerating society cannot be left to an educational system that dwells on the past.

2. Technology will play an increasing role in the solution of major social problems.

The problems associated with a world population that will double in the next thirty years will in part center around greatly expanded and improved systems for meeting society's needs for water, air, transportation, communication, power generation, housing and

THE PROFILE OF CHANGE

whether it be -- Transportation, Medicine,
Communications, Construction, Production,
Metallurgy, Power Generation,
Non-metallics, etc.



other elements of a compatible environment.

3. A review of the literature and an analysis of the data in our earlier studies supported the following listing as major social, environmental, and operational problems that faces man in the immediate and subsequent future.

   a. Pollution (air, water, noise, etc.)
   b. Conservation (natural resources)
   c. Housing and Urban Development
   d. Power Generation
   e. Water Supply
   f. Production Processes
   g. Transportation
   h. Communications
   i. Resource Utilization
   j. Trash, Waste, Junk Disposal

Each of these pressing problems has been identified as a significant area for study in the senior high school Industrial Arts laboratory.

The problems of food production, medicine, social ordering,

etc., were not included due to an attempt to remain within some semblance of boundaries associated with the present program of Industrial Arts, as well as within the functional capability of the laboratory and its environment.

The focus in this program is on technology and its potential for assisting in the development of people capable of dealing with such major problems.

SPECIFICALLY, I AM SUGGESTING A
FORM OF INDUSTRIAL ARTS THAT -- EXPLORES
THE APPLICATION OF TECHNOLOGY IN THE
SOLUTION OF MAJOR SOCIAL, ENVIRONMENTAL,
AND OPERATIONAL PROBLEMS THAT FACE MANKIND.

The significance of this emphasis on what technology can do for mankind in the solution of major social, environmental, and operational problems takes on many dimensions as valid educational enterprise.

George S. Counts has stated that ... "We must strive in all haste to rear a generation capable of living with and directing towards humane ends all the resources of science and technology". (4, p.9)

Aaron W. Warner in his introduction to Technology and Social Change has made the following statement:

> "A source of great authority over nature, the modern scientific-technology promises to be both the hope of man's future and the instrument of his enslavement and his destruction. If we are to avoid the disasters it lay open to us and take advantage of the opportunities it presents, we ... must understand what modern technology is, what it means, and what must be done with it, if it is to serve man well." (15, p.1)

Don Fabun in his Dynamics of Change discusses a similar point in the following comment:

> "The forces of change, ... are amenable to our guidance. If we seem to be hurried into the future by a runaway engine, it may be that the main reason it is running away is that we have not bothered yet to learn how it works, nor steer it in the direction we want it to go." (6, p.5)

The need for understanding technology and what it can do for mankind is not unique to any group within the school or society. It is a universal requirement in a democracy where decision making at all levels is basically tied to the sophistication of the electorate. Such education transcends the criteria of general education and assumes the position of imperative education if man is to attain new heights of humane achievement rather than self destruction and enslavement.

The need for understanding technology in a democracy is discussed under the topic of "Technological Ignorance" in the text Dynamics of Change as follows:

> "The contention that persons ignorant of technology can function in a democracy to any affect when

> the society is a technological one is dubious. Understanding is not a prerequisite of control, it is control. (6, p.30)

The above statement leads directly into one of the major objectives of the new program for the senior high school. This goal is to provide a form of education that will attempt to bridge the gap between the technological elite and the great masses of the population who must live with and make decisions relative to the uses of technology in shaping man's future. The constantly widening gap between these two groups has been a matter of sincere concern by such people as C. P. Snow, Barbara Ward, and those involved in the Commission on the Year 2000. The issue is largely one of who will maintain control coupled with the capability of the populace to make decisions within their sphere of understanding.

Emphasis on the study of technology in the past has been on its capability to produce more and better, to move man from the cave to the skyscraper, to deliver the human from the hoe to the supermarket, to extend man's life and reduce infant mortality, to move man and messages at undreamed of speeds, and to build huge automated complexes as well as our sprawling cities.

Technology has not only made these accomplishments possible, but in the process of such achievements, man has seen fit to pollute his air and water to a point of threat to human extinction.

He has used and discarded the fruits of his productivity with such facility as to create severe problems of waste, junk, and trash disposal. He has created and sold airconditioners for which there is insufficient electricity to use them when they are needed. He has severely over taxed the traditional water resources to a point of imposed legal regulations and critical shortages. His ingenious medical developments have contributed to a population explosion that is rapidly becoming a matter of crisis proportions. These are but a few of the problems that have followed in man's wake as he has sought the good and abundant life as well as the means to expand his horizons.

The problems mankind faces are fully within his grasp to solve. The magnificent accomplishments of NASA in its Lunar Expeditions is ample evidence of what a nation can do when it comes to a decision of what it wants to do, how it wants to use its resources, and the extent to which society will employ its technological "know how." This same "can do" thinking and resolve could meet the challenges in the problem areas identified, as well as many others.

The technology to deal with many of these problems already exists.

"Dr. Lee A. DuBridge, President of the California Institute

of Technology, has said that from a purely technical standpoint we know enough to --

1. Produce enough food to feed every mouth on earth -- and to do this even though the population may double or triple.

2. Make fresh water out of sea water and then irrigate all of the world's arid regions.

3. Produce enough energy from uranium to light and heat our homes and offices, electrify our railroads, and run all of our factories and mills.

4. Build houses, buildings, and indeed whole cities, which are essentially waterproof, heatproof, cold proof and storm proof." (2, p.13)

Dr. Alvin W. Weinberg, Director of the Oak Ridge National Laboratories discusses a series of "technological fixes" in an article titled "Can Technology Replace 'Social Engineering'?" (17, p.56,57)

Two such fixes in the past according to Dr. Weinberg have dealt with the problems of war and widespread poverty. A third fix proposed for the future deals with the solution of the water shortage problem through the use of nuclear desalination plants.

A further examination of the potential for the production of

water as well as electricity is found in a statement by Fred Warshofsky in his text The 21st Century -- The New Age of Exploration.

> "At today's prices, a kilowatt-hour of nuclear energy costs approximately one half a cent. By the year 2000 nuclear power may reduce the cost to about a tenth of a cent a kilowatt-hour. That would make the cost of producing a thousand gallons of fresh water less than half a cent. Today, industrial fresh water sells for about twenty cents per thousand gallons, including delivery." (16, p.50)

The essential ingredient to the solution of many of the previously mentioned problems facing mankind in the years ahead is education. The future citizen will depend more and more on the application of technology to deal with these and related problems.

Technological ignorance on the part of a vast proportion of the populace may lead to self destruction, ineffectiveness, or decisions by a technocratic elite. A recent article in the Science and Technology journal titled "Managing Technology" discussed the issue of planning for change by "technical men".

> "Technical men are likely to be increasingly concerned about the future in their own ways. As we move into what is being called the 'postindustrial society,' science and technology are bound to be more and more at the center of change and more concerned with the planning of change." (19, p.73)

This statement leads me to a slight by-pass in the general discussion of this topic to interject a point or two in order that I may clarify a personal position. That is, I do not labor

under any delusions that technology alone is the answer to the many problems mankind faces.

Although this discussion deals with the application of technology in the solution of major problems facing mankind in the future, I am fully aware that this proposition is only one side of the coin.

The issue is whether man can continue to exist with other man, or whether mankind can endure in a world of excesses growing out of an uncontrolled materialistic appetite symbolized by waste, exploitation, and destruction at any cost. This is a facet of the problem that I, too, am concerned about. It is a major component of the other side of the coin.

The problems of pollution, conservation, housing, power generation, transportation, communication, resource utilization, and productivity grow out of the aspirations, the ideals, the sensitivities or insensitivities of mankind. The solution to these problems <u>does not lie alone</u> in the realm of technology, but in the realm of man's concern for man, and a sense of direction that takes issue with the notion that the planet earth is an inexhaustible source of natural beauty and richness to be converted by senseless economic values into a sprawling junkyard.

Dr. Daniel Bell in writing on the year 2000 stated the issue

very simply when he wrote -- "The problem of the future consists in defining one's priorities and making the necessary commitment"... (1, p.8)

Erich Fromm elaborated on this point in his text The Revolution of Hope Toward A Humanized Technology in the following quotation:

> "...man, not technique, must become the ultimate source of values; optimal development and not maximal production the criterion for all planning." (8, p.100)

The issue appears to be one of order as well as priority. That is to say, there must be a broad and searching analysis made of the directions man wants to travel and then apply his ingenious technology towards the established goal.

Bertrand de Jouvenel was quoted on this point in a recent text by John McKale titled The Future of the Future.

> "Finding out what we want should become a major object of attention...there is a vast difference between letting changes occur under the impact of technological advances and choosing the changes we want to bring about by our technological means." (10, p.8)

The citizenry must be brought to a level of concern as well as understanding regarding the course and direction that the society is moving. The pressures of advertising, production, and consumption leave us caught up in a system which should force the

intelligent citizen to inquire about the direction and meaning of such a society.

Thomas Tanner in the March, 1970 issue of Phi Delta Kappan discussed the matter of tomorrow's technology and today's license in a series of statements consistent with the point I am making.

> "A common excuse for the exercise of greed, irresponsibility, and shortsightedness is that tomorrow's technology can clean up the resultant mess. ...Business equates growth with progress, and the depletion of natural resources is euphemistically referred to as development of natural resources.
>
> ...technology is applied to these problems (pollution, depletion of natural resources, famine, degredation of environment) while population growth and economic irresponsibility are accepted or even lauded. Smog devices, desalination plants, floating cities, and high-yield food production methods lull the public into a blind faith in technology..."
> (13, p.354)

The issue is clear that the total school and all other agencies involved in the development of our national goals must get on with the business of dealing more effectively with the elements of social, economic, and environmental awareness.

The task of providing an environment compatible with the needs of future man cannot be accomplished by any single group concern such as technology, sociology, physiology, etc. It will require first of all a sense of direction and then a sense of urgency and judgment in using the skills and knowledge needed to

accomplish the task. Again, I must indicate that my presentation of this other side of the coin was simply to illustrate that I do not have a total preoccupation with technology and a lack of sensitivity to the other elements associated with the problem.

It became obviously clear that the senior high school program should be broad based and relevant to the total spectrum of students as opposed to present offerings that favor limited skill and technical development. It was projected that the program would assume the dimension of inclusiveness that would not be hemmed in by occupational aspiration or curricular involvement. The problems as identified belong to no special group, they are everybody's problems.

The objective was to arrive at a content that would be integrally tied with major societal problems to such an extent that the school would actually move out into that mainstream of life itself. It was to be an educational program that explored the solutions of man's pressing problems, present and future. The student would in this way find himself a part of the on-going scene. This principle of contemporary involvement is supported in a statement by Arthur W. Foshay in an article appearing in the March, 1970 issue of Phi Delta Kappan.

> "Our secondary school students...want to see themselves as participants in the world they live in, not as apprentices for it. They want the world to be in the school and the school in the world." (7, p.352)

It is here where the issue of "relevancy" comes into play. The population is a fast-maturing high school student body with a sophistication that far exceeds his predecessors. Today's student is greatly concerned about where society is going and what lies ahead. The communication media of television, radio, newspapers, and paperbacks have continuously bombarded the student with endless commentary on each of the problem areas identified for study. The central concerns of this program are in fact central concerns of society itself. This in itself is a profound difference over the content of present and past programs. It also is important to note that other educators have expressed similar interest in dealing with contemporary social and environmental problems.

Dr. John Goodlad in an article titled "The Educational Program to 1980 and Beyond" has urged a look ahead in curriculum development.

> "...Get into the curriculum the problems likely to be facing young adults in 1980. These persons currently are in the primary years of schooling. If we were to begin now, we could plan for them a junior high school curriculum organized around problems of population, poverty, pollution, and many more." (9, p.57)

James Swan has written an article titled "The Challenge of Environmental Education" in which he states --

> "Creating a concern for environmental quality can, and I feel should, be a function of our schools. I should like to suggest that this could be done through a comprehensive 'environmental education' program.
>
> ...environmental education is concerned with developing attitudes of concern for environmental quality.
>
> Environmental education...is concerned with involving people in environmental problem solving."
> (12, pp.26-68)

Another objective of the high school program is to place the student and the Industrial Arts activity out in the mainstream of life. This will involve a whole new orientation on the part of the teacher as well as the school itself.

Ralph Tyler in a discussion of the "Curriculum for a Troubled Society" has stated that --

> "One factor standing in the way of developing an effective curriculum and educational program is the tradition that the high school should be an adolescent island outside the major currents of adult life." (14, p.35)

The involvement of the student in the examination of such problems, the study of alternate solutions, and the identification of future problems could have profound effects upon the future. I will venture to mention a few as follows:

1. The voting public (decision makers) of the future would have a sensitivity to the kind, nature, and extent of such problems facing mankind.
2. He would have some understanding of and sensitivity to the nature of solutions and the alternatives related to the problem.
3. The strength of his adult participation in dealing with such problems may be greatly enhanced by his earlier involvement in real and direct experiences related to them.
4. The student through appropriate kinds and levels of involvement could begin to feel he is a part of the system and he does have a role to play.
5. The student's communication with his or her parents and other adults on the concerns and activities of the program would have the potential for even wider levels of involvement.

A number of guidelines were established for the development of the senior high school proposal for Industrial Arts. These grew out of the extended and in-depth study of the nature of the student, curriculum trends, socio-psychological theories affecting behavior, and the nature of the society of the future.

1. The development of each individual was of prime concern. That is, the concerns, interests, aptitudes, aspirations, abilities and motivations of each individual must remain the central focus.
2. The program has centered on a process orientation. In this respect emphasis has been placed on such processes as problem solving, inquiring, experimenting, evaluating, constructing, planning, analyzing, and cooperating with others.
3. A high level of student involvement has been structured into the learning activities of the program.
4. The physical setting of the program extends out into every sector of the school, the community, and the nation as valid sources for information and assistance.
5. The traditional craft textbooks have given way to contemporary newspapers, magazines, scientific journals, industrial house organs, government publications, commission reports, and research findings.
6. A broad range of instructional media is applicable and includes audio and video tapes, movies, slides,

models, exhibits, graphics, collections, and specimens.

7. The role of the teacher may be described as a "manager of education". It is his job to facilitate, encourage, stimulate, evaluate, advise, and to provide an optimum environment for learning.

8. Although the emphasis is primarily on the development of the individual, stress has been given to the structuring of group process involvement and learning experiences in order to provide the setting for interaction, role-playing, self-direction, peer-culture identification, cooperation, challenge, assuming responsibility, and democratic participation.

No attempt has been made at an identification of problem areas by grade levels. This is a matter for individual school or teacher planning and decision making. It is a flexible operating structure built around a series of problems. The opportunity for interdisciplinary involvement with the many other areas of the school are numerous.

Of special importance is the possibility of a series of strong cooperative activities between the high school program and the surrounding community which may have any numbe of live projects

associated with the several problems as previously listed. The setting of the school might appropriately find itself in the chambers of the water purification plant, the local pollution control office, a meeting of the housing and urban development committee, a planning meeting of a dust control project in a local industry, as well as a field experiment on pollution of a stream, bay, or river.

A good start in planning for such a program might be to explore the local area for active projects or needed areas of concern and action. It might be well to determine the range of resources in the community that could be called upon for support and assistance in the instructional elements that would get beyond the technical capability of the teacher.

This senior high school program has within it the possibility for real and meaningful experience. It would put Industrial Arts out into the mainstream, out where the real answers and the dynamics of society provide an educational input unequalled by other areas of the school.

The work in the laboratory would be an integral part of the total experience. Planning, constructing, testing, evaluating, take on meaning as the students use tools, materials, ideas, and ingenuity to explore the application of technology in the solution of major problems facing man in the future.

The illustration on page 30 is a graphic illustration of the several elements that comprise the program.

1. Substance -- This is the essence of the proposal, i.e., major problems facing man in the future.
2. Delineation -- This is the identification of selected problem areas considered suitable for study in the Industrial Arts facility and which would be somewhat related to the technology usually associated with the area. These include: pollution, power, housing, communications, conservation, production, resource utilization, transportation, and disposal.
3. Considerations -- This is a listing of the concerns that helped shape the design of the educational experiences, the strategies, and the methodologies. These included an emphasis on the individual, inquiry as a process, involvement, the nature of resources, laboratory environment, use of media, the implementation of "learning to learn" procedures, the role of the teacher, an inter-disciplinary approach, and a learning process inter-face that brings together a variety of supportive and complimenting processes.

Substance

Major Problems

Facing Man in the Future

Delineation

Pollution Power Housing Water

Communications Conservation Production

Transportation Resource Utilization

Considerations

the individual

inquiry

involvement

resources

laboratory environment

learning process inter-face

media

learning to learn

role of teacher

interdisciplinary

Methodology and/or

Educational Experiences

Process Elements

Unit Approach	Group Process (Group Proj.)	Research, Experimentation Development
Unit Organization	Group Organization	Independent Study
Contract Method	Role Playing	Problem Method
Independent Study	Contract Method	Project Method
Project Method	Independent Study	Seminar Method
Problem Method	Problem Method	Inquiry
Seminar Method	Project Method	

4. Process Elements -- These are the major instructional organizational strategies that were considered to be most appropriate for the study of as well as an encounter with selected major problems facing man in the future.

Each of these processes, i.e., the unit approach, the group process, and the research, experimentation, and development procedure have been tried out in higher education classes, high school classes, and at the junior high school level using the major problems approach. A more complete explanation of the use and procedures involved in each of these three organizational strategies will be presented by my colleagues here on the platform.

Finally, by way of summary and review I would like to present the issue as I see it; a proposal that addresses itself to the issue; a series of hypotheses or speculations about the program; and lastly a listing of anticipated outcomes.

Issue:

The need to develop a program for Industrial Arts at the senior high school level that would have a high degree of relevance for and acceptance by the student, the school, and society.

Proposal:

That the Industrial Arts profession operating at the senior high school level move towards a program which -- explores the application of technology in the solution of major social, environmental, and operational problems that face mankind.

Hypotheses:

1. It is possible to develop a society-oriented problems approach that could be successfully carried out in the environment (immediate and expanded) of the Industrial Arts laboratory.

2. The development of such a program would attract students from all levels and curricula to a much greater extent than the present programs.

3. The acceptance and recognition of the program by the school and community would be a great deal improved over existing activities.

4. A broader spectrum of students would find interest, a personal association, and a higher degree of relevance to their own lives in this program.

5. It would appeal to students in keeping with their growing concern for the kind of a society in which they are growing up.

6. The potential for developing broad and diverse manipulative, mental, and social skills would be equal to or greater than the more conventional programs.

7. The Industrial Arts teacher in general is the most appropriate of the professional educators to deal with such a program.

8. The program would have broad inter-disciplinary potential with unusual opportunities for the interface of learning processes.

Outcomes: It is projected that the program would lead to --

1. a concern for the trend and direction of society,

2. an awareness of the alternatives available to man in his search for solutions to certain major problems,

3. the student's active involvement in exploring the solutions to selected societal problems,

4. an awareness of the accelerating technology and a readiness for changes,

5. a bridging of the gap between the overwhelming majority of the populace and the technical elite,

6. an awareness of occupational opportunities associated with the application of technology to the solution of selected major problems facing mankind,

7. an opportunity to use the tools and materials of industry in a new and dynamic encounter with society,

8. an opportunity to test one's ingenuity, ability, and potential in meaningful activities directed towards the solution of pressing problems,

9. an awareness of one's own capabilities as a member of a team, group, or as an individual,

10. an increased ability to use the expanded resources of the community in the process of "learning to learn".

There are two major thrusts in this program that I feel are important. First, there is the persistent interest in and insistence on the goal that the student is the prime element for development in education.

One of the finest expressions of this point recently appeared in the Chemical and Engineering News.

> "It is impossible for the average boy to grow up and use his remarkable capacities that are in every boy, unless the world is for him and makes sense. And a society makes sense when it understands that its chief wealth is these capacities." (18, p.4A)

Secondly, it is a thrust of the school out into society in a dimension that has few parallels. The program is an active involvement with live societal problems that demand high priorities

rather than the usual preoccupation with meaningless educational minuets and the pursuit of activities related to the past.

> The challenge is to move out into the mainstream of education, to move out into the deep and wide channels of involvement with the total school and society.
>
> --out into the waters of life itself where the depth of issue will permit the maneuverability to cope with the range of human interests, abilities, and capacities...

Literature Cited

1. Bell, Daniel. "The Year 2000 - The Trajectory of an Idea," in Toward The Year 2000 - Work in Progress. Edited by Daniel Bell. Boston: Houghton Mifflin Co., 1968.

2. Bernardo, James V. "Educational Implications of the Space Program," Apogee 67. Second quarter (published quarterly by the Douglass Aircraft Company), May 1967.

3. Brown, Harrison; Bonner, James; Weir, John. The Next Hundred Years. New York: The Viking Press, 1957.

4. Counts, George S. "Education and the Technological Revolution," Readings in Curriculum. Glen Hass and Kimball Wiles, editors. Boston: Allyn and Bacon, 1965, pp. 8-17.

5. Day, Lincoln H., and Day, Alice Taylor. Too Many Americans. Boston: Houghton Mifflin Co., 1964.

6. Fabun, Don. The Dynamics of Change. New Jersey: Prentice-Hall, Inc., 1968, p. 170 (Chapter 1).

7. Foshay, Arthur W. "How Fare the Disciplines?" Phi Delta Kappan. Vol. LI, No. 7, (March 1970), p. 352.

8. Fromm, Erich. The Revolution of Hope Toward a Humanized Technology. New York: Bantam Books, Inc., 1968.

9. Goodlad, John I. "The Educational Program to 1980 and Beyond," Implications for Education of Prospective Changes in Society. E. L. Morphet and C. O. Ryan, editors. New York: Citation Press, 1967, p. 57.

10. McHale, John. The Future of the Future. New York: George Braziller, Inc., 1969.

11. Rubin, Louis H. "The Object of Schooling: An Evolutionary View," Life Skills in School and Society. ASCD Yearbook, Washington, D.C.: National Education Association, 1969, p. 171.

12. Swan, James. "The Challenge of Environmental Education," Phi Delta Kappan. Vol. LI, No. 1, (September 1969), pp. 26-28.

13. Tanner, Thomas R. "The Science Curriculum: Unfinished Business for an Unfinished Country," Phi Delta Kappan. Vol. LI, No. 7, 1970, pp. 353-355.

14. Tyler, Ralph W. "Curriculum for a Troubled Society," NCEA Bulletin. Vol. 66, No. 1, (August 1969), p. 35.

15. Warner, Aaron W. Technology and Social Change. Edited by Eli Ginzberg. New York: Columbia University Press, 1964.

16. Warshofsky, Fred. The 21st Century -- The New Age of Exploration. New York: The Viking Press, 1969, p. 50.

17. Weinberg, Alvin M. "Can Technology Replace 'Social Engineering'?" Space Digest. January 1967.

18. "Career Opportunities; Search for Relevance," Chemical and Engineering News. 47:4A-22A, March 10, 1969.

19. "Managing Technology," Science and Technology. January 1969, p. 72-73.